

**THAT WHICH IS CLAIMED IS:**

1. An apparatus for generating a relatively wideband swept frequency signal comprising:

a first generator for generating a first swept frequency signal;

a second generator successively switching between different frequency signals while creating undesired phase discontinuities during switching;

a mixer connected to said first and second generators for mixing the first swept frequency signal and the successively switched different frequency signals to produce the relatively wideband swept frequency signal; and

a phase coasting unit connected downstream of the mixer to reduce the undesired phase discontinuities created during switching in the relatively wideband swept frequency signal.

2. The apparatus according to Claim 1 wherein said phase coasting unit comprises a third-order phase locked loop (PLL).

3. The apparatus method according to Claim 2, wherein said third-order PLL comprises:

a phase detector;

a switch connected to the phase detector and controlled to open during a switching interval;

a plurality of integrators downstream from the switch; and

voltage controlled oscillator downstream from the plurality of integrators.

4. The apparatus according to Claim 1, wherein said first generator comprises a first digital synthesizer to generate the first swept frequency signal; and wherein said second generator comprises:

a second digital synthesizer to generate an offset frequency signal;

a plurality of frequency converters to successively combine the offset frequency signal with a reference frequency signal to produce the successively switched different frequency signals; and

a controller for controlling the operation of said second digital synthesizer to maintain phase continuity between the successively switched different frequency signals.

5. The apparatus according to Claim 1, wherein said second generator comprises:

a plurality of frequency converters receiving a reference frequency signal; and

a second digital synthesizer providing an offset frequency signal to the plurality of frequency converters to successively combine the offset frequency signal with the reference frequency signal to produce the different frequency signals.

6. An apparatus for generating a relatively wideband swept frequency signal comprising:

a first digital synthesizer for generating a first swept frequency signal;

a second generator successively switching between different frequency signals while creating undesired phase discontinuities during switching;

a mixer connected to said first and second digital synthesizers for mixing the first swept frequency signal and the successively switched different frequency signals to produce the relatively wideband swept frequency signal; and

a third-order phase locked loop (PLL) defining a phase coasting unit and connected downstream of the mixer to reduce the undesired phase discontinuities created during switching in the relatively wideband swept frequency signal.

7. The apparatus method according to Claim 6, wherein said third-order PLL comprises:

a phase detector;

a switch connected to the phase detector and controlled to open during a switching interval;

a plurality of integrators downstream from the switch; and

voltage controlled oscillator downstream from the plurality of integrators.

8. The apparatus according to Claim 6, wherein said second generator comprises:

a second digital synthesizer to generate the offset frequency signal; and

a plurality of frequency converters to successively combine the offset frequency signal with a reference frequency signal to produce the successively switched different frequency signals.

9. A method for generating a relatively wideband swept frequency signal comprising:

generating a first swept frequency signal with a first generator;

successively switching between different frequency signals with a second generator while creating undesired phase discontinuities during switching;

combining the first swept frequency signal and the successively switched different frequency signals to produce the relatively wideband swept frequency signal; and

reducing the undesired phase discontinuities in the relatively wideband swept frequency signal created during switching by coasting over the undesired phase discontinuities in the relatively wideband swept frequency signal.

10. The method according to Claim 9, wherein coasting over the undesired phase discontinuities comprises providing a phase coasting unit defined by a third-order phase locked loop (PLL).

11. The method according to Claim 10, wherein the third-order PLL comprises:

a phase detector;

a switch connected to the phase detector and controlled to open during a switching interval;

a plurality of integrators downstream from the switch; and

voltage controlled oscillator downstream from the plurality of integrators.

12. The method according to Claim 9, wherein the first generator comprises a first digital synthesizer; and wherein the second generator comprises a second digital synthesizer generating an offset frequency signal and successively combining the offset frequency signal with a reference frequency signal to produce the respective different frequency signals.

13. The method according to Claim 9, wherein successively switching between different frequency signals comprises:

connecting a plurality of frequency converters to an output of a reference frequency signal generator; and

coupling an offset frequency signal to the plurality of frequency converters to successively combine the offset frequency signal with the reference frequency signal to produce the different frequency signals.

14. A method for generating a relatively wideband swept frequency signal comprising:

generating a first swept frequency signal with a first digital synthesizer;

successively switching between different frequency signals with a second generator while creating undesired phase discontinuities during switching, the second generator comprising a second digital synthesizer generating an offset frequency signal and a plurality of frequency converters receiving an output of a reference frequency signal generator and combining the offset frequency signal with the reference frequency signal to produce the respective different frequency signals;

combining the first swept frequency signal and the successively switched different frequency signals to produce the relatively wideband swept frequency signal; and

reducing the undesired phase discontinuities in the relatively wideband swept frequency signal created during switching by providing a phase coasting unit to coast over the undesired phase discontinuities in the relatively wideband swept frequency signal.

15. The method according to Claim 14, wherein the phase coasting unit comprises a third-order phase locked loop (PLL).

16. The method according to Claim 15, wherein the third-order PLL comprises:

- a phase detector;
- a switch connected to the phase detector and controlled to open during a switching interval;
- a plurality of integrators downstream from the switch; and
- voltage controlled oscillator downstream from the plurality of integrators.

17. The method according to Claim 15, wherein the second generator further comprises a switch connected to the plurality of frequency converters to produce the respective different frequency signals.